CLASSIFICATION CONFIDENTIAL CONFIDENTIAL

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT [redacted] 50X1-HUM

CD NO.

COUNTRY USSR

SUBJECT Scientific - Miscellaneous
Biographic

HOW PUBLISHED Monthly periodical

DATE OF INFORMATION 1949

DATE DIST. 6 Oct 1950

WHERE PUBLISHED Moscow

NO. OF PAGES 4

DATE PUBLISHED Apr 1950

LANGUAGE Russian

50X1-HUM [redacted]

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF ESPIONAGE ACT 50 U. S. C., 31 AND 32, AS AMENDED. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW. REPRODUCTION OF THIS FORM IS PROHIBITED.

THIS IS UNEVALUATED INFORMATION

SOURCE Nauka i Zhizn, No 4, 1950.

STALIN PRIZE WINNERS--INNOVATORS IN SCIENCE AND ENGINEERING

Acad A. N. Nesmeyanov

The space available in an article does not permit describing all the works awarded Stalin Prizes this year [1949].

Professors D. D. Ivanenko and A. A. Sokolov, of Moscow State University, with their fellow worker in a laboratory of the Academy of Sciences USSR, Yu. A. Pomeranchuk, received the Stalin Prize for work on the theory of "luminous" electrons and solution of contemporary problems in electrodynamics. This work has been generalized in a monograph, Classical Field Theory, by Ivanenko and Sokolov.

It is well known that credit for the first ideas on the proton-neutron structure of the atomic nucleus, which laid the foundations for all nuclear physics, belongs to the Soviet physicist, D. D. Ivanenko.

One of the most important sections of Ivanenko and Sokolov's prize-winning book treats the theory of radiation emitted by electrons in accelerators (betatrons, et al.). The remarkable phenomenon of "luminous" electrons predicted by the authors plays an important part in modern accelerators.

The two-volume monograph, Molecular Oscillations, by Professors M. V. Vol'kenshteyn, M. A. Yel'yashevich, and B. I. Stepanov, which won a Stalin Prize, is a major work crowning many years of labor. Soviet scientists have stated and solved in a new way problems connected with the theory of oscillatory molecular spectra. Spectrum analysis of molecules, founded on investigation of infrared spectra and spectra of combination dispersion, has acquired great significance in the problem of analyzing mixtures and in establishing essential details with regard to the structure of molecules. Hitherto such analysis rested, to a great extent, on a purely empirical basis. The work of the Leningrad scientists has opened a road for quantitative evaluation in this field.

The works of V. I. Danilov, Corresponding Member of the Ukrainian Academy of Sciences, deal with the crystallization of liquids. From his researches, Danilov came to the conclusion that supercooled fluids, free from foreign bodies,

CLASSIFICATION CONFIDENTIAL CONFIDENTIAL

STATE	X	NAVY	X	NSRB		DISTRIBUTION						
ARMY	X	AIR	X	FBI		AEC X						

could be divided into three categories according to their capability of crystallizing spontaneously. In the first category he put all fluids (of the salol type) which are not capable of spontaneous crystallization at any temperature whatever; such fluids can be converted to a vitreous state at any rate of cooling. In the second category he placed fluids, to which metals also belong, that necessarily crystallize spontaneously at all temperatures below a specific temperature. These fluids cannot be converted to a vitreous state at any cooling rate. Finally, the thrid category comprises liquids which crystallize spontaneously only within a certain temperature range. Liquid fluids of this type can be converted to a vitreous state only at a sufficiently high rate of cooling.

Danilov's work on phase conversions of matter is a substantial contribution to science. It is also valuable in metallurgical practices, since the nature of the crystallization process in metals and alloys is a basic factor in determining the structure and properties of ingots.

In construction mechanics, as in many other fields, Soviet science has won first place. This is true of the general theory of elasticity, the theories of plasticity, shells, stability, and other problems.

The prize-winning monographs of V. Z. Vlasov's prize-winning monographs, on the General Theory of Shells and Construction Mechanics of Thin-Walled Three-Dimensional Systems, facilitate solution of many problems connected with designing and building modern installations and constructions.

Professor N. V. Kornoukhov's work as summarized in Strength and Stability of Beam Systems and his methods of calculation were utilized in calculating the stability of a hammer crane with a 350-ton load capacity for the Novo-Kramatorsk Plant among others.

D. L. Timrot and N. B. Vargaftik, scientific co-workers of the All-Union Heat Engineering Institute imeni Dzerzhinskiy, have made a valuable contribution to national economy and to industry by their research on the heat conductivity and viscosity of water vapor at temperatures up to 600° C and pressures up to 300 atm.

Academician M. M. Dubinin is well known for his work on the theory of adsorptive phenomena. His work which won the Stalin Prize deals with the influence of the structure of true adsorbents on their adsorptive properties. His classification of adsorbents by structural types makes it possible to predict the behavior of a given adsorbent in carrying out this definite process.

Professor V. A. Kargin was awarded a Stalin Prize for work on the mechanical properties of high-polymer substances. He analyzed three states of these substances: the vitreous, highly elastic, and viscous-fluid states. He established the connection between temperature limits and the nature of structural changes. His research is of great value for industries utilizing cellulose and rubber, and in the production of plastics and synthetic fiber.

First-class prizes for outstanding work in biology were awarded to Academicians Ye. N. Pavlovskiy and K. I. Skryabin.

Pavlovskiy's main interest in parasitology has been in insect-carriers of infectious diseases. The cardinal point of his work is his theory of natural foci of disease. This has lead to the solution of problems connected with Siberian forest encephalitis and many other practical public-health problems on a biological basis of active prophylactic measures against parasitic diseases.

Skryabin has elucidated the characteristics of over 600 species of trematodes, especially flatworm trematodes -- platyhelminthas trematodes, which are parasitic in animal and human organisms. This is the first monograph in world

literature to cover all trematodes. It also gives methods of diagnosis, prophylaxis, and cure for diseases caused by these parasites. Hence, Skryabin's work, in addition to its theoretical value, has a great practical value for veterinarians, doctors, zootechnicians, and biologists.

A number of prizes were awarded in the field of historical science. Many workers in the metallurgical industry also received recognition.

The engineers of the Ural Heavy-Machine Building Plant, under the direction of A. Sh. Taleysnik, built a large mold-forming machine with a load capacity of 40 tons and complete mechanization of conveyance for fresh loam and removal of waste loam. Conversion of heavy parts from hand molding to machine molding and utilization of mechanization have increased productivity more than $2\frac{1}{2}$ times, eliminated heavy physical work, and doubled the yield of useful casting from one sq m of mold area with a considerable improvement in the quality of casting. According to its technical and economical indexes, this machine greatly surpasses the best foreign mold-forming machines.

A Stalin Prize was awarded to a group of engineers under B. S. Mil'man for a new technological process of obtaining high-strength cast iron. This new cast iron is twice as strong as the cast iron presently used in industry. It also has greater impact strength and ductility. Consequently, it can to a great extent, replace steel and malleable cast iron. It is also expensive than these metals.

A collective of engineers of the Leningrad Metal Plant imeni Stalin under N. N. Kovalev received a Stalin Prize for building and putting in operation improved 102,000-hp turbines for the Dnepr Hydroelectric Power Station imeni Lenin.

The engineer collective of the Ural Heavy-Machine Building Plant, under the management of G. L. Khimich, built the first Soviet rail and girder rolling mill. This is an extensive mechanical complex consisting of over 200 machines with a total weight of 16,500 tons, which is based on a continuous flow of rail and structural steel production. It occupies an area of 80,000 sq m. Its productivity, new features, and the mechanization and automatization of control for individual machines and groups of machines make it superior to all existing mills in the Soviet Union as well as abroad.

A Stalin Prize was also won by a group of engineers from the Dmitrov Plant under M. B. Arvan for designing a chain-bucket excavator. It is reliable and simple to operate in digging trenches for water, gas, and petroleum pipe lines or ditches for continuous foundations. The excavator in question represents an entirely original domestic design and the efficiency of the machine is nigh.

A group of specialists under K. A. Kuznetsov designed a heading machine for cutting tunnels which mechanizes cutting, removing, and loading of rock on cars, and works at three times the previous rate of operation.

A. M. Stolyarov invented a very practical machine for extracting construction ashlar of different sizes. Complete mechanization of all cutting and conveying operations reduces labor costs to half that of making common brick, decreases power consumption $1\frac{1}{2}$ times, and completely eliminates the use of fuel.

The USSR is a pioneer in machine construction for mining operations in vertical shafts. A collective of engineers under Ya. I. Balbachan designed a loading machine for this type of mining which reduces manpower by one half and increases the cutting rate by one third.

One of the most important factors in saving the time and strength of miners is mechanization of the means of transporting them down to and up from the mine. A group of engineers under M. K. Galushko has designed an original car for use in sloping pits. These cars are widely used in the Donets coal fields where there are many pits with long sloping workings.

CONFIDENTIAL

The great development of construction under the postwar Five-Year Plan has created demands for new building materials. The cement problem has been solved by engineers under the leadership of Professors V. N. Yung, B. G. Skramtayev, and V. V. Mikhaylov, who have invented expanding, water-repellent, and alumina types of cement.

Soviet scientists have also solved the problems of cement shrinkage and have developed grades showing rapid setting accompanied by expansion. The impermeability of the new expanding cement to water after setting makes it particularly valuable for calking seams in subway construction, and for waterproofing shafts and foundations. In these applications it replaces expensive lead formerly used for that purpose.

The water-repellent cement is extremely durable under damp conditions and is not affected adversely by short periods of direct contact with water. The water-repellent film scales off and the cement sets normally only when the cement is mixed with sand and other fillers in preparing the mixture.

A group under the direction of Professor I. I. Kitaygorodskiy have developed a new building material, "penosteklo" (foam glass). It is very light -- one cu m weighs from 170 to 300 kg. It has very little heat conductivity, relatively high mechanical strength, and is water and frost resistant. It is soundproof. It is not affected by water or fire, can be made in any desired color, and combines well with cement, brick, and stone. It is used for refrigeration and in the construction of living quarters and industrial buildings.

- E N D -